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Evaluation of psychometric properties of child post-traumatic cognitions inventory in Iranian children and adolescents

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ABSTRACT

Background: The crucial role of post-traumatic cognitions in the development or non-development of post-traumatic stress disorder in children and adolescents prompted us to first provide appropriate assessment tool for future research in this field. For this purpose, we have included in our agenda the investigation of psychometric properties of the Persian version of the child post-traumatic cognitions inventory (CPTCI) in Iranian children and adolescents, which is one of the best assessment tools in this field. **Methods:** In this descriptive study, a total of 195 Iranian children and adolescents in the age range of 8 to 18 years participated. Sample was selected by available sampling method. Instruments, including the Post-Traumatic Stress Disorder Symptom Scale Self Report (PSS-SR), the Child Depression Inventory (CDI), and the Revised Children's Manifest Anxiety Scale (RCMAS) were used to assess convergent validity of the CPTCI. Confirmatory factor analysis method was used to determine the construct validity of CPTCI. Also, reliability was measured using Cronbach's alpha, and then retest reliability was assessed. **Results:** The confirmatory factor analysis results showed the model's satisfactory fitting. Considering the correlation results, CPTCI has good convergent validity. The test-retest reliability was 0.76 and Cronbach's alpha for all questions of the CPTCI was 0.944, which indicates that this test has good reliability. **Conclusion:** Results of this study showed that CPTCI could be used with considerable confidence for Iranian children and adolescents that experienced a traumatic event.

Keywords: Validity, Reliability, Post-Traumatic Cognitions, Children, Adolescent, Psychometric Properties

1. INTRODUCTION

Over the past 20 years, research on cognitive factors has expanded in children and adolescents at risk for post-traumatic stress disorder (PTSD) (Dalgleish et



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al., 2005). A fundamental question about this disorder is why some people have only a period of distress after trauma, while others experience debilitating and chronic symptoms (Dalgleish, 2004). PTSD Cognitive models in adults suggest that dysfunctional assessment of trauma, the world, self, and the symptoms of PTSD indicates their prominent role in maintaining these symptoms (Dalgleish, 2004; Ehlers and Clark, 2000; Foa and Rothbaum, 2001). Research on how children and adolescents respond to traumatic events shows that the consequence of trauma, that is, whether or not they have a psychological disorder, depends on the individual's cognitive evaluation of the experience (Landolt, 2012). This finding is also reflected in the latest version of the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), in which a new criterion has been added to the diagnosis of PTSD called negative changes in cognition and mood (American Psychiatric Association, 2013). This change in diagnosis is consistent with cognitive etiological models such as Ehlers and Clark's, who believe that dysfunctional post-traumatic cognition affects the formation and maintenance of chronic traumatic flow (Ehlers and Clark, 2000).

Ehlers and Clark's model suggests that people who experience PTSD following a traumatic event are less likely to see an accident or trauma as a past event and often think that the accident will have negative consequences in the future. In their view, the traumatic events, as well as their consequences, are extremely negative, which ultimately creates the feeling of threat in the present. This threat can be felt both internally (I am inadequate; I will never be the same person) and externally (the world is a dangerous place, and I am extremely vulnerable), and encourage the use of maladaptive coping strategies (Ehlers and Clark, 2000). The two main evaluation models that mediate the development of PTSD are the idea that the world is an extremely dangerous place and the view that I am inadequate (Foa and Rothbaum, 2001). Unfortunately, unlike many studies that have evaluated trauma-related cognitions in adults (Ehlers et al., 2003; Meiser-Stedman, 2002; Stallard, 2003), few studies have been conducted on children's cognition, one of the reasons being the lack of accurate measuring instruments in children. Assessing post-traumatic dysfunctional cognitions is very important for measuring a child's response to trauma, planning psychological interventions (such as formulating child problems in cognitive-behavioral therapy), as well as evaluating and correcting theoretical perceptions of PTSD in children and adolescents (de Haan et al., 2016).

Based on our search, there is no standard for measuring trauma-related cognition in Iran. The Child Post-Traumatic Cognitions Inventory (CPTCI) is the child version of the Post-Traumatic Cognitions Inventory (PTCI) (Foa et al., 1999). PTCI is a tool for measuring post-traumatic assessments in the adult cognitive model of PTSD and has been used in many studies (Diehle et al., 2015; Foa et al., 1999; Meiser-Stedman et al., 2009). The items used in CPTCI are based on the original PTCI (Foa et al., 1999) and the cognitive model of Ehlers and Clark (Ehlers and Clark, 2000). This test has been performed and evaluated in various countries including, Netherlands (Diehle et al., 2015), Germany (de Haan et al., 2016), United Kingdom (Meiser-Stedman et al., 2009) and Korea (Lee et al., 2018). All of them reported this test to have good psychometric properties that had good reliability and validity. Since this test has not been used in Iran and Iranian samples, this study sought to investigate the validity and reliability of the CPTCI.

2. MATERIALS AND METHODS

Present study was designed as a descriptive survey.

Participants

To check the reliability and validity of the inventory, the minimum number of samples should be 75. However, considering that this inventory has 25 items, 125–250 people should be considered (5–10 samples for each item) (Anthoine et al., 2014). Therefore, 195 children and adolescents aged 8–18 years were used as samples to improve the validity and reliability of results. Using a purposive method, samples were selected from a population that was more likely to encounter traumatic events. So, abused or neglected children covered by charitable or welfare institutions in Tehran province were enrolled.

Measures

In this study, the Post-Traumatic Stress Disorder Symptom Scale Self Report (PSS-SR), the Child Depression Inventory (CDI), and the Revised Children's Manifest Anxiety Scale (RCMAS) were used to assess convergent validity of the CPTCI.

Child Post-Traumatic Cognitions Inventory

CPTCI is a 25-item inventory that assesses post-traumatic cognition in children and adolescents. It is based on Ehlers and Clark's cognitive model (Ehlers and Clark, 2000) and consists of 41 items. Of these, 33 items are the same as those in the adult PTCI, and other items include negative cognitions related to world, self, and self-blame. The principal component analysis of these 41 items

eventually yielded a 25-item two-factor model for CPTCI with internal validity of 0.57, test-retest reliability of 0.75–0.89, and Cronbach's alpha of 0.88 (Meiser-Stedman et al., 2009).

Post-traumatic Stress Disorder Symptom Scale Self-Report

This scale has 17 items that reflect the symptoms of PTSD. A 4-point Likert scale has been used to rate items in this questionnaire starting from never to ≥ 5 times a week (almost always). The highest score is 51 (Foa et al., 1993). Coffey et al., (2006) assessed the psychometric properties of this scale, and the results showed that it has high internal reliability and validity for 1 month test–retest. In Iran, Mirzamani et al., (2007) measured the correlation between this scale and diagnostic interview, which was significant at the level of 0.001, meaning that this scale is a good method for screening PTSD.

Child Depression Inventory

CDI is an edition of Beck's Depression Inventory developed by Kovacs to assess childhood and adolescent depression. This questionnaire is a self-report tool consisting of 27 questions to assess cognitive, behavioral, and psychomotor symptoms. The questions are graded on a 3-point scale of 0, 1, and 2. Range of scores from 0 to 54, and the higher the score, the greater the degree of depression (Dehshiri et al., 2009; Finch et al., 1985). The range of validity coefficients for this questionnaire is between 0.84 and 0.82, and its retest validity is 0.81 (Masip et al., 2010). In Iran, the psychometric properties of this scale have been measured, and its validity has been confirmed (Dehshiri et al., 2009).

Revised Children's Manifest Anxiety Scale

This scale is one of the most valid and widely used anxiety tests for children and adolescents, which consists of 37 items, of which 28 items measure anxiety and the other 9 are lie-detection items and evaluate the subject's false-positive answers. Respondents must answer yes/no to each item. The higher the score on the anxiety scale, the higher the level of anxiety (Coffey et al., 2006). Various studies have shown that this scale has good retest reliability (0.85) and Cronbach's alpha (0.89) (Forcadell et al., 2020; Wilson et al., 1990; Wisniewski et al., 1987). Taghavi and Alishahi (2003) reported retest reliability of 0.67 and good validity for this scale, In Iran.

Procedure

Data collection began in June 2020 in Tehran, Iran and lasted 4 months, after receiving ethics approval from the ethics board of Shahid Beheshti University of Medical Sciences (Approval code: IR.SBMU.MSP.REC.1398.871). It should also be noted Participation in this study was voluntary. All participants were explained about the goals and process of the study and the children's parents read and signed the written forms of informed consent. Initially, adolescents and children who had experienced trauma were screened based on their records and interviews conducted by centers' psychologists. Then, patients' willingness to participate was obtained, and the questionnaires were completed by the participants. Inclusion criteria were an experience of trauma and ability to read and write. The exclusion criterion was not willing to complete the inventory. This inventory was first translated into Persian by a fluent translator and then translated into English by an English language specialist. The two English forms were examined by another person fluent in English to ensure consistency. Eight clinical psychologists then checked the translation for content validity, and experts reported that the translation is smooth and fluent and can evaluate what it was intended for (Content Validity Ratio = 0.91). After examining the content validity to assess the validity of the items, a questionnaire was evaluated on 50 adolescents. Validity results showed acceptable items.

Data analysis

The validity of the CPTCI was assessed using confirmatory factor analysis and convergent validity. Also, reliability was measured using Cronbach's alpha, and then retest reliability was assessed. PSS-SR, CDI, and RCMAS were used to assess convergent validity.

3. RESULTS

There were 195 participants in this study, of whom 112 were females, and 83 were males. The children and adolescent participants were between 8 and 18 years old. The most common type of trauma experienced was a personal experience of violence. The demographic characteristics of the participants are shown in Table 1.

Table 1 Demographic characteristics of the participants

Gender	F (%)	Age (year)	F (%)	Type of trauma	F (%)	Time elapsed after trauma	F (%)
Female	112 (57.4)	8–11	54 (27.7)	Rape	4 (2.0)	<1 week	16 (80.2)
Male	83 (42.6)	X12–14	76 (39.0)	Sexual assault	13 (6.7)	1 week to 1 month	53 (27.2)
Total	195 (100.0)	15–18	65 (33.3)	Natural disaster	17 (8.7)	1–3 months	66 (33.8)
Total			195 (100.0)	Personal experience of violence	64 (32.8)	>3 months	60 (31.0)
				Vicarious experience of violence	23 (11.8)	Total	195 (100.0)
				Accidents	33 (16.9)		
				Scary disease or medical treatment	14 (7.2)		
				Multiple and frequent traumas	27 (13.8)		

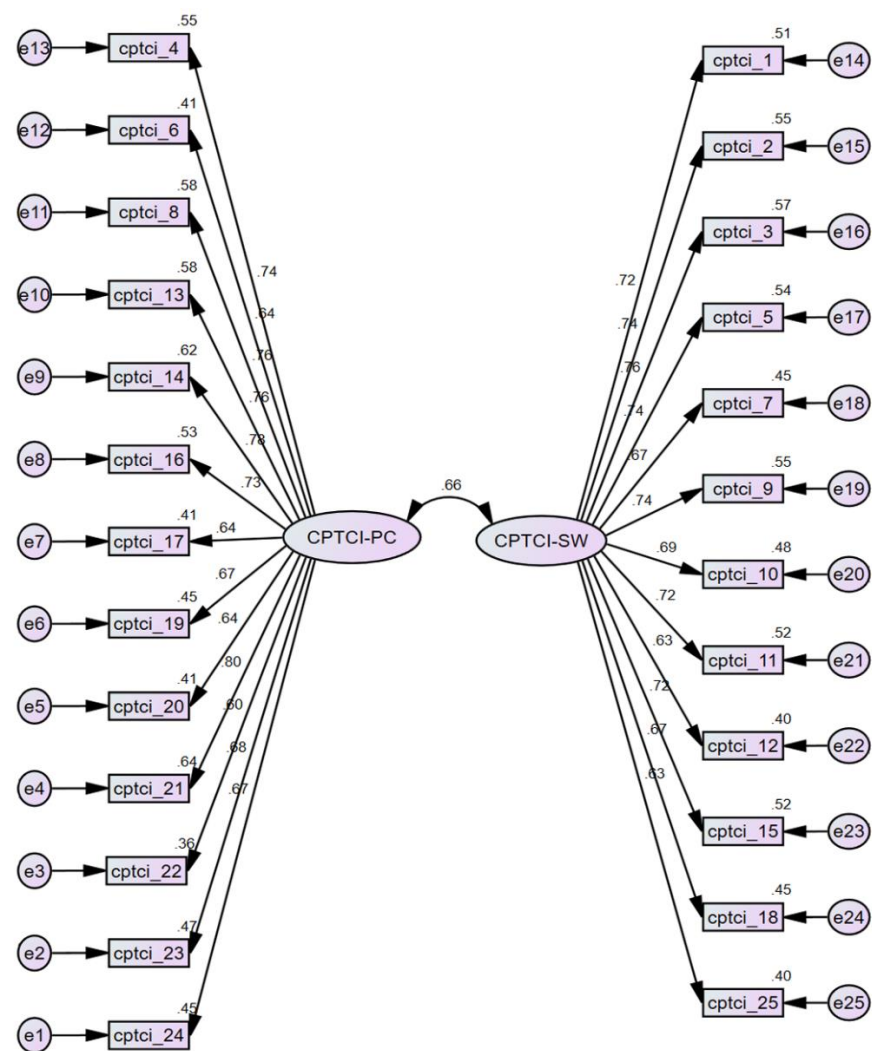


Figure 1 Standardized coefficients of each question on the subdomains of CPTCI.

The construct validity of the CPTCI was tested using confirmatory factor analysis. Table 2 shows the results of the fitting indices of the data measurement model. The results showed that the fitting indices of the confirmatory measurement model are acceptable, and the model is a good fit for the data. Figure 1 shows the standard coefficients of the questions on the two-factor structure—permanent and disturbing change (CPTCI-PC) and fragile person in a scary world (CPTCI-SW). The results of standard coefficients for all questions were higher than 0.60, which indicates a good standard coefficient for the questions. Also, all coefficients were significant at the level of <0.05.

Table 2 Model fitting indexes with data in CPTCI.

Chi-squared	df	GFI	AGFI	CFI	RMSEA	NFI	IFI
344.56	235	0.869	0.819	0.953	0.057	0.891	0.954

The reliability of the CPTCI was tested after 2 weeks with a sample of 49 people. The results indicated that the reliability of the test–retest was 0.76 for the whole scale, 0.75 for permanent and disturbing change (CPTCI-PC), and 0.78 for the fragile person in a scary world (CPTCI-SW). Cronbach's alpha for all questions of the CPTCI was 0.944, which indicates that this test has good validity. Also, the detection coefficient of question 13 was higher than other questions. Cronbach's alpha results and detection coefficients for each of the questions are shown in Table 3.

Table 3 Descriptive and distribution indexes for each question of CPTCI

Question	M	SD	SK	KU	D	α	Question	M	SD	SK	KU	D	α
1	1.65	0.90	0.43	1.21	0.57	0.94	14	1.72	0.90	0.45	1.14	0.67	0.94
2	1.86	0.88	-0.86	0.55	0.63	0.94	15	1.98	0.99	-0.45	0.71	0.63	0.94
3	1.81	1.05	-0.29	1.02	0.63	0.94	16	1.60	0.98	0.39	1.35	0.67	0.94
4	1.64	0.91	0.64	1.29	0.63	0.94	17	1.85	0.93	0.24	1.01	0.54	0.94
5	2.14	1.00	-0.73	0.55	0.59	0.94	18	1.98	1.04	-0.73	0.70	0.57	0.94
6	1.49	0.83	1.21	1.53	0.51	0.94	19	1.65	0.99	0.18	1.25	0.68	0.94
7	1.75	1.00	0.69	1.25	0.60	0.94	20	1.92	1.08	-1.00	0.68	0.60	0.94
8	1.67	0.85	0.12	1.04	0.65	0.94	21	1.55	1.00	0.98	1.57	0.70	0.94
9	1.93	0.97	-0.34	0.81	0.59	0.94	22	1.44	0.84	2.90	1.96	0.55	0.94
10	2.12	1.11	-1.16	0.49	0.66	0.94	23	1.77	0.95	0.00	1.03	0.58	0.94
11	2.07	1.10	-1.04	0.57	0.65	0.94	24	1.69	0.97	0.81	1.33	0.64	0.94
12	2.11	0.94	-0.40	0.64	0.54	0.94	25	2.18	0.99	-0.85	0.41	0.62	0.94
13	1.83	0.96	-0.91	0.67	0.71	0.94							

Note: M = mean, SD = standard deviation, SK = skewness, KU = kurtosis, D = discrimination, α = Cronbach's alpha

Convergent validity of the CPTCI was tested using the PSS-SR, CDI, and RCMAS questionnaires using the correlation coefficient between the components. The correlation between the two-factor structure—permanent and disturbing change (CPTCI-PC) and fragile person in a scary world (CPTCI-SW)—had a significantly positive correlation with the factors of PSS-SR, CDI, and RCMAS. Correlation results indicated good convergent validity of CPTCI (Table 4).

Table 4 Correlation between the components of CPTCI, and between the components of RCMAS, DSM, and CDI.

Raw	Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1	CPTCI_PC	21.80	9.09										
2	CPTCI_SW	23.57	8.82	.56**									
3	DSM	5.75	2.87	.51**	.40**								
4	RCMAS_PF	4.08	2.47	.60**	.55**	.37**							
5	RCMAS_ESC	4.93	2.50	.51**	.51**	.29**	.67**						
6	RCMAS_Anxiety	34.39	2.11	.52**	.41**	.32**	.61**	.62**					
7	CDI_Depressed Mood	8.83	2.81	.37**	.36**	.15*	.36**	.36**	.27**				
8	CDI_Feeling Useless	5.50	1.39	.24**	.12	.17*	.35**	.21**	.29**	.39**			
9	CDI_Interpersonal Problems	6.63	1.98	.28**	.25**	.17*	.33**	.44**	.31**	.51**	.25**		

10	CDI_Feeling Unhappy	12.89	3.18	.39**	.31**	.24**	.44**	.38**	.36**	.50**	.51**	.53**	
11	CDI_Negative Self-esteem	7.64	2.49	.26**	.17*	.13	.27**	.24**	.27**	.61**	.52**	.46**	.49**

*Correlation is significant at the 0.05 level. **Correlation is significant at the 0.01 level.

4. DISCUSSION

As mentioned earlier, the CPTCI is a 25-item questionnaire that assesses a person's cognition after experiencing trauma. This questionnaire is based on the original PTCI and has good reliability and validity (Foa et al., 1999). Given the importance of these cognitions in the pathology, formulation, and treatment of trauma symptoms (de Haan et al., 2016; Landolt, 2012), access to an instrument to measure them both at the initial evaluation stage and in subsequent evaluations to monitor treatment progress is essential. Also, such an instrument can pave the way for further research on this factor by providing the possibility of measuring it. Since the use of this instrument in a different culture and language requires confirmation of its psychometric properties in the same context, the psychometric properties of the Persian version of CPTCI in Iranian children and adolescents have been investigated in this study.

The results of this study showed that the CPTCI in Iranian children and adolescents has a two-factor structure, permanent and disturbing change (CPTCI-PC) and fragile person in a scary world (CPTCI-SW). Moreover, the validity of this questionnaire was investigated by measuring its convergent validity and reliability using internal compatibility coefficient and retest reliability. The results showed that the Persian version of this scale has good reliability and validity. These results are similar to the results of previous research in this field (de Haan et al., 2016; Diehle et al., 2015; Lee et al., 2018; Meiser-Stedman et al., 2009). Due to the correlation of negative cognitions with the symptoms of trauma, depression, and anxiety (Meiser-Stedman et al., 2009; Mętel et al., 2019; Pfeiffer et al., 2017).

In this study, PSS-SR, RCMAS and CDI were used to determine the convergent validity of CPTCI. There is a significantly positive correlation between CPTCI and the above scales, confirming the convergent validity of this instrument, and this correlation is consistent with the results of previous studies (Meiser-Stedman et al., 2009; Mętel et al., 2019; Pfeiffer et al., 2017). The high prevalence of trauma and its symptoms (Alisic et al., 2014), its widespread effects (Ethier et al., 2004; Lipschitz et al., 2000), and the mediating role of post-trauma cognitions in pathology and treatment, in children and adolescents population (Meiser-Stedman et al., 2009; Mętel et al., 2019; Pfeiffer et al., 2017) emphasize the importance of the issue of trauma in this population and the key role of the cognitive factor because this factor can clarify the path of formulation and provide effective interventions to treat the symptoms of trauma. However, a prerequisite for monitoring this factor in pathology, treatment, and research is access to a tool that has good reliability and validity. Therefore, the present study evaluated the psychometric properties of the Persian version of CPTCI in Iranian children and adolescents, the results of which confirmed its reliability and validity.

Due to the ethnic diversity in Tehran province, it is possible to generalize the results to Persian speakers. However, the impact of ethnicity and culture has not been directly investigated in the present study. Therefore, in generalizing the results to specific cultural, racial, and dialectal communities, we need to exercise caution. Also, the data of this study were obtained through questionnaires and the self-assessment method. Therefore, variables such as the patient's psychological state at the time of data collection, response style, and external motivations may have potential effects on their response. As a result, it is better to use more comprehensive and objective methods such as structured interviews in future studies.

5. CONCLUSION

The results of this study show the acceptable validity and reliability of the Persian version of CPTCI in the population of Iranian children and adolescents. Therefore, access to this tool for assessment of post-traumatic cognition in the population of Iranian children and adolescents paves the way for future studies in this field.

Ethical approval

The study was approved by the Medical Ethics Committee of School of Medicine, Shahid Beheshti University of Medical Sciences (ethical approval code: IR.SBMU.MSP.REC.1398.871 and NO: 21786).

Limitations and Future Directions

This study has several limitations that need to be considered. Firstly, the sampling method in this study is not random, which raises the possibility that the sample group is not a good representative of the population, so it is necessary to be careful in generalizing the results. Secondly, the non-use of clinical interviews and the mere use of self-assessment methods have somewhat limited the

results obtained. It is suggested that in future studies, the psychometric properties of this tool be evaluated both in a more representative sample and using clinical interviews.

Contributors

SH and MB contributed to the conception and design of the study. SH, MB and MAL contributed to acquisition of data. IA and MAL contributed to data analysis and interpretation. SH, MB and IA contributed to the drafting of the manuscript and critical revision of the manuscript for important intellectual content. All authors participated in writing and approving the final draft of the manuscript.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are presented in the paper.

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